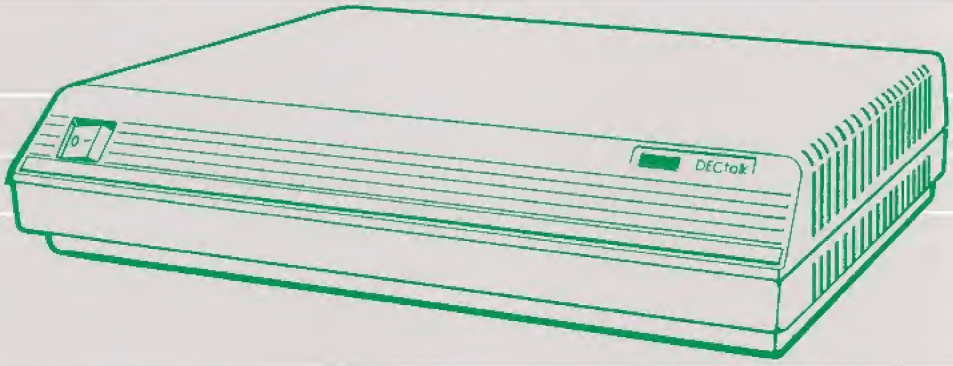
DECtalk MARKETING GUIDE



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TERMINALS PRODUCT GROUP

DECtalk MARKETING GUIDE

Table of Contents

Introduction

Purpose/Audience

This guide provides a reference to the applications and features of DECtalk, Digital's entry in the voice synthesis market. It is for use by anyone selling DECtalk. It identifies viable DECtalk applications and the features that make DECtalk attractive for those applications.

Contents of Guide

The area of computer/voice interaction is one that is growing dramatically. The Voice Market Overview, in Section I, provides a brief description of the markets for voice products. Terminology is defined and trends are identified. This section is especially useful for understanding the market for voice products.

DECtalk Applications, in Section II, provides a list of opportunities that suit DECtalk well. The applications described include notes on DECtalk's strongest selling points for those applications.

DECtalk Features, in Section III, is an overview of product features. It is focused on DECtalk capabilities and how DECtalk works.

The Appendices contain information on documentation, available sales tools and other sales support. We hope this guide helps you understand the growing opportunities in voice and how Digital's products meet those opportunities.

Currently, DECtalk's major benefits include the following:

1. Ease of Installation - since its basically a terminal, it is easily integrated into the computer system between a PC or a mainframe.
2. High Quality Speech - using proprietary technology DECtalk combines human quality speech with a nearly unlimited vocabulary.
3. DECtalk allows Touch-Tone™ telephones to act as computer terminals effectively turning the telephone system into a public computer network with literally millions of terminals already installed.

Ordering Information

Part Number: DTC01-AA
Description: DECtalk

™Touch-Tone is a trademark of AT&T.

Section I. Voice Market Overview

This section discusses:

- Definitions of different voice technologies
- Characteristics of each technology

This section provides a basic understanding of the emerging technologies used in voice/computer interaction.

Voice Market Overview

Voice is a rapidly growing technique for entering information into a computer system and retrieving information from a computer system. Today the technology is on the edge of broad based acceptance. In this section we will cover the basic categories of voice markets, position the technologies and discuss trends and limitations.

A. Technology Definitions

Voice Store/Forward Systems - These systems take human speech and sample it very quickly. This sampling allows the speech pattern to be digitized. The digitized speech is then stored in a computer system. On command the stored voice can be retrieved and replayed. The voice input is not acted on. Digital's Telephone Management System on the Professional 350 is an example of voice store/forward.

Voice Recognition - These systems turn speech into machine readable code. This allows the computer to act on the spoken commands. This is different from store and forward systems which record and play back data. Voice recognition technology will be the basis for data processing systems that accept spoken input. Digital does not currently offer products in this category.

Speech Synthesis - Speech synthesis is the translation of machine text into speech. These systems can translate text into the associated phrase to be spoken or directly speak the text being transmitted. DECtalk falls in the category of a speech synthesis device.

B. Voice Technology – Capabilities and Uses

The technology for all of these voice products is in its infancy. Of the three categories, voice store and forward is the most advanced. Voice recognition is the least developed. DECtalk represents a major advance in the speech synthesis technology because it has, for the first time, the level of voice quality and practically unlimited vocabulary needed to make synthesis products acceptable for broad public use. Of course, within categories manufacturers' products vary widely in quality and sophistication.

Voice Store and Forward Systems – These systems measure "goodness" by the quality of the replayed speech. Generally exact, or near exact, reproduction of the speaker's voice is required. To do this voice sampling rates are high, roughly 20K times per second. Each sample is a discrete piece of information that is digitized. The digitized data can be stored using existing mass storage techniques. A key characteristic of voice store and forward systems is the relatively large amount of mass storage required. High sample rates combined with the capability of storing a reasonable length message makes this a large amount of storage a requirement.

Voice store and forward is used in telephone management systems. The system controlling a PBX could, using store and forward technology, be used to take telephone messages. Store and forward could also be used to add voice notes to data or text. Spoken phrases added to text already on the system could then be spoken when the video text is output. This is referred to as voice annotated data.

Voice Recognition – Voice recognition is a relatively new technology. Most voice recognition systems today must deal with discrete comments, meaning they can only accommodate one word at a time. They are also speaker dependent. These systems cannot recognize context and, in most cases, cannot deal with multi-digit numbers. Numbers must be spoken one at a time. Speaker dependent systems must be adjusted or trained to each user's speaking pattern. Each time the system is used the command is spoken into the system and then typed to confirm the command. Speaker independent systems and the ability to accommodate continuous data will be crucial to broad based applications for voice recognition systems.

Speech Synthesis – Currently speech synthesis encompasses two techniques. Both involve the conversion of text to speech and differ widely in capabilities and speech quality.

The first speech synthesis technique in prevalent use is the combination of prerecorded phrases and interpretation of text. Based on the text the terminal receives, the appropriate phrase is selected and spoken. Unlike voice store and forward, speaker replication is not essential. The sound is synthesized. These systems provide very understandable speech, but are limited in vocabulary to predefined phrases or syllables.

The second speech synthesis technique is the actual conversion of ASCII text to voice quality sound conversion. Although this technique offers nearly unlimited vocabulary, voice quality is usually sacrificed. Speech quality in these systems is highly dependent on the accuracy of preprogrammed letter-to-sound rules.

While DECtalk uses the second technique, (conversion of ASCII text to sound), it overcomes the speech quality problem in other systems with superior letter-to-sound rules. DECtalk's features are discussed, in more detail, in the "features" section in this guide.

C. Market Trends

All the techniques are growing rapidly. Today all markets are relatively small, but nearly doubling each year. This is expected to continue into the 1990s as systems become more sophisticated and overcome current limitations.

Each technique tends to be represented by many specialized manufacturers and one or two large systems manufacturers. The key to market development will be the investment of major computer manufacturers in each category. It appears smaller manufacturers, in the aggregate, will be capable of meeting a decreasing percentage of voice market demand. This is due to technical, capital and manufacturing limitations.

Section II. DECtalk Applications

This section discusses:

- Applications
- How DECtalk can help
- What makes DECtalk especially appropriate for the application

This is provided as a thought provoking list of applications that you can translate into actual opportunities.

DECtalk Applications

This section discusses several applications where DECtalk can easily be used. Some applications are common to many types of businesses. Others are industry specific. The quality of the spoken output is acceptable for all applications. That, and the fact DECtalk is easy to install, are treated as givens for all applications. Each application is identified with a brief statement on the solution DECtalk offers. Additionally the key features that sell DECtalk into that application are listed.

Banking

Opportunity: Relieve analysts and clerical personnel of mundane tasks of: answering telephone inquiries, retrieving account balances, interest rates and other information on the bank's data base; and relaying it back to the inquirer.

Solution: Connect DECtalk to CPU and telephone line. Telephone line serves as input channel and voice output channel. DECtalk converts Touch-Tone™ code to ASCII code the computer understands. Simple inquiries are handled by DECtalk. Allow user to connect to bank personnel for problem resolution.

Key Features:
- Telephonics input/output
- Local telephone line
- Touch-Tone™ to ASCII translation (Speech rate limits information flow not data communication rate.)
- Standard connections
- Ability to consider context (e.g., $17.35 and $17.35 million both spoken correctly)

Data Base Industry

Opportunity: Data base providers can expand available market to anyone with a Touch-Tone™ keypad. Allows users to subscribe to simple data base services without expensive initial outlays. Serves as an introduction to data base services.

Solution: Connect DECtalk to CPU and telephone line. Provide basic services such as Dow Jones headlines, financial data, travel information, etc. DECtalk could allow access to simple inquiry/response cycles. A basic service could be established to obtain subscriptions with the potential for data base provider to sell more sophisticated, profitable service at a later date.

Key Features:
- Telephonics input/output
- Touch-Tone™ to ASCII translation
- Multiple voices (to distinguish header vs. text, different service)

Electronic Mail

Opportunity: Allow people to access mail when away from a video terminal or teleprinter.

Solution: Connect DECtalk to CPU and special telephone lines. Provide number that people can dial. Access mail using Touch-Tone™ keypad. Allow user to scan list of waiting mail noting subject and length of message. Use Touch-Tone™ keypad to listen to mail, place mail in print queue and such.

Key Features:
- Telephonics input/output
- Touch-Tone™ to ASCII translation
- Standard connections
- Multiple voices (distinguish header from text)
- Ability to consider context, abbreviation

Event Scheduling

Opportunity: Relieve operators of the need to check availability of seats, costs, etc., for planned events. Reduce the possibility of errors in communicating information. Allow users 24 hour access to information.

Solution: Connect DECtalk to CPU and telephone line. Use DECtalk with applications software to query schedule, identify availability of seats, book reservations and even reserve seats.

Key Features:
- Telephonics input/output
- Touch-Tone™ to ASCII translation
- Local telephone line

Financial Services

Opportunity: As in banking applications, analysts and clerical personnel retrieve information on account status. This activity is relatively mundane and susceptible to errors.

Solution: Utilize DECtalk's telephonics feature by connecting it to the telephone line and CPU. Use DECtalk as described in the banking application section. Straightforward inquiries and transactions are accomplished directly by the user with a Touch-Tone™ keypad. System would transfer user to bank personnel for problem resolution.

Key Features:
- Telephonics input/output
- Local telephone line
- Touch-Tone™ to ASCII translation
- Standard connections

OEMs

Opportunity: OEMs using Digital hardware and software, design turnkey systems for end users. OEMs selling into applications described in this section will find DECtalk features useful.

Solution: Approach OEMs selling into appropriate applications. DECtalk features that are advantageous to the end user can help OEMs generate additional sales.

Key Features:
- Standard terminal connections
- Compatible terminal control codes
- Styling matches other Digital products

Pay by Phone

Opportunity: Pay by phone can apply to many industries. It can involve operator intervention to log account to be credited, funds to be charged and such. Possibilities exist for error due to operator intervention.

Solution: Install DECtalk to CPU and telephone line. User can dial number to pay for service. Examples are cable TV company planning to institute request/pay for service by event. Other pay by phone opportunities include catalog sales, fuel oil sales, utility bills and telephone bills.

Key Features:
- Telephonics input/output
- Standard terminal connections

Proofreading

Opportunity: Many proofreading schemes require two people. One person is reading the text while the other is speaking the text. This scheme would be prominent in publishing firms, newspapers and other written media firms.

Solution: Provide a DECtalk at the proofreading station. With the growing prevalence of word processing systems most written pieces will be in ASCII text in an electronic file.

Key Features:
- Internal speaker with earphone plug available
- Product package and styling
- Standard terminal connections
- Ability to consider context, abbreviations

Order Entry/Pricing Inquiry

Opportunity: Sales people need portable devices to access data base for product information, to log an order or check order status.

Solution: As in other dial in applications, connect the DECtalk to the CPU and a dedicated telephone line. Allow sales people to access information using a Touch-Tone™ keypad. Used in conjunction with a data managing software package, such as Datatrieve, information can be obtained easily and at any time. This would give the sales person the opportunity to prepare for sales calls the previous evening.

Key Feature:
- Telephonic input/output
- Touch-Tone™ to ASCII translation
- Standard connections

Security Systems

Opportunity: Real time building monitoring systems have no means to directly alert occupants of problems. Information is communicated via an operator who watches the monitor systems.

Solution: DECtalk can be connected to the building monitor system and PA system. Based on the emergency detected and location, DECtalk can announce appropriate action over the PA system. DECtalks could even be installed by floor or specific area and provide specific information to that part of the building.

Key Feature:
- Standard connections
- Ability to connect to existing PA systems

Telemarketing Referrals

Opportunity: Current systems may require an operator to take information from the caller and look up the nearest dealer or distributor. This may introduce errors. Operators that are not knowledgeable about products may be asked questions that should be handled by local sales person.

Solution: Connect DECtalk to telephone line and computer system containing referral information. Using a Touch-Tone™ keypad callers can key in telephone number, including area code, to indicate location. DECtalk then speaks to sales office, dealer or distributor nearest to them. Default system allows inquiries by rotary dial phone users who are then connected to operator personnel.

Key Features:
- Telephonics input/output
- Local telephone line
- Touch-Tone™ to ASCII text conversion
- Ability to understand context, abbreviations

Visually Impaired

Opportunity: Video and hardcopy terminals often are not optimized for use by the visually impaired. Many times information is on a computer data base that the visually impaired need to access.

Solution: Install DECtalk in series with a video terminal or teleprinter. The keyboard will act as an input device and DECtalk will speak the system response as it is displayed on the output medium.

Key Features:
- Local and communication ports allow DECtalk to be installed in series with another terminal.
- Standard terminal connections
- Internal speaker with earphone plug available
- Standard control conventions

Process Control/Manufacturing

Opportunity: Current systems require operator to monitor system visually. Lights and buzzers are used to identify unusual situations but do not provide specific information.

Solution: Connect DECtalk to process control system and even local intercom system. DECtalk could announce incremental changes in the process and provide information to areas not serviced by monitors.

Key Features:
- Standard terminal connections
- Internal speaker
- Option of connections to external speaker
- Different voices to provide emphasis

Education Systems/Simulators

Opportunity: Spoken computer feedback (voice store and forward) is cumbersome. All feedback must be recorded and filed for retrieval when needed. Computer voice stored and forward voice may be a slow and not quite appropriate solution.

Solution: Install DECtalk as system output device. English language training systems that are used for training, flight simulators, etc., can now utilize the ASCII text output as voice commands. DECtalk's nearly unlimited vocabulary would speed up the system and assure appropriate feedback.

Key Features:
- Standard terminal connections
- Internal speaker with earphone plug available
- Ability to understand context, abbreviations
- Different voices to provide emphasis

The opportunities for voice output are nearly unlimited. The key point is that nearly all opportunities involve new applications. They do not replace other terminal opportunities, hence they represent incremental business. This list is not all encompassing. We expect, in fact we hope, you will encounter other situations that suit DECtalk well.

Section III.
DECtalk Features Overview

This section discusses:

- How DECtalk works
- Competitive information
- Product features/benefits

This is provided so you can understand, at a macro level, how the product achieves high quality speech output, its key capabilities of the product and its competitive strengths.

DECtalk Features Overview

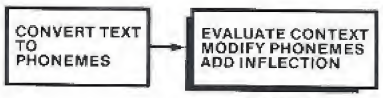
A. How It Works

Contrary to first impressions, DECtalk does not work by magic. The basic operation is quite straightforward. While you do not need to know exactly how it works to sell it, a bit of additional information is interesting and may be useful when dealing with an especially analytical customer.

DECtalk takes a three-step approach to convert ASCII text to speech. In the first step it takes the ASCII text and converts each word into its phonetic equivalent. This is done by locating the word in a dictionary or applying letter-to-sound rules.*

STEP ONE

Conversion of the text to its phonetic equivalent, in Step One, is performed in one of three ways. First, DECtalk tries to locate the word in its predefined dictionary. Second, if the word is not there, the unit looks in the user defined dictionary. Finally, DECtalk will apply unique letter-to-sound rules to pronounce the word. Basically it follows the same process a person would when he or she encounters words to be spoken.



STEP TWO

In Step Two the phonetic phrase is evaluated for context. At this point the inflection for punctuation or location of a word in a sentence is applied. The context for abbreviations or phrases that are spoken different than they are written (e.g., $17.35 million) is also included.

STEP THREE

In Step Three, for conversion of the digital phonetic phrase to speech output, the modified phonetic phrase is sent to the digital synthesizer unit. This step is essentially a digital-to-analog conversion.

B. Competition

The market for speech synthesis products is in its infancy. A key reason has been the absence of a major manufacturer in this market. Digital's recent announcement of DECtalk changes that situation. To date, Digital is the only major computer manufacturer with a speech synthesis offering.

Other major manufacturers, particularly Texas Instruments and Hewlett Packard, do offer speech synthesis units. These units are much lower in functionality than DECtalk. They do not offer the quality of speech, variety of voices, ease of use and ability to consider context. In many cases they are not easily installed and may require major changes in system files. They generally do not offer telephonics capability. The cost of DECtalk is justified by its high quality, understandable speech output and ease of installation and use. These products do not have the capabilities that allow it to compete with DECtalk.

There are many small manufacturers of speech synthesis devices. These products also severely lack the quality and capabilities of DECtalk. In addition, these manufacturers lack the capacity to establish a sizable market. These are instances of smaller companies licensing their speech synthesis technology to larger manufacturers. Although this allows them to resolve their capacity problems, it does not resolve the functionality problems.

*The algorithms used to develop the letter-to-sound rules in Step One and to consider context in Step Two are proprietary. These algorithms are what give DECtalk its superior speech quality.

C. Features/Benefits

The following is a summary of DECtalk's features and benefits.

Features	Benefits
• RS232-C terminal port	• Connect to any standard serial port
• Standard terminal escape sequence and control conventions	• Easy to write application software • Uses existing operating system terminal support
• Telephone input/output – Touch-Tone™ to ASCII text conversion	• Connect DECtalk to existing modular lines • Touch-Tone™ keypad to input data or request information • Information transfer limited by speaking rate, not data flow rate
• Local telephone line	• Transfer system control to an operator
• Speaker/earphone output jacks	• Connect to existing PA systems • Private listening
• Internal speaker	• Usable without other sound systems, no additional investment
• Ability to consider context	• Text files can be used without modification
• Understand abbreviations	• Text files can be used without modification
• User definable dictionary	• Phonetically define frequently used terms specific to an application
• Eight different voices	• Use voice most suited to the application • Different voices to distinguish header from text or request for input vs. system response • To provide emphasis
• Variable speaking rate	• Conform rate of speech to complexity of message

Appendix A – Documentation

DECtalk Owner's Manual	EK-DTC01-OM-001
DECtalk Programmer's Reference Manual	EK-DTC01-RM-001
DECtalk Installation Manual	EK-DTC01-IN-001
DECtalk Programmer's Reference Card	EK-DTC01-RC-001
DECtalk Technical Sheet	ED-25623-54

Appendix B – Sales Tools

- 35mm Slide Set
  Script & Slides
- Demo Software
  1-617-493-TALK
  Dial up VAX
  Demo Programs
- Product Brochure
- Applications Notes

Appendix C – Specifications

Dimensions	Height: 4 in (10.0 cm) Width: 18 in (45.0 cm) Depth: 12 in (30.0 cm) Weight: 16 lb (7.3 kg)
Interface	Connection to any Digital system supporting RS232-C serial port and XON/XOFF protocols
Baud Rates	110, 300, 600, 1200, 75/1200, 2400, 4800, 9600
Format	ASCII characters 7 bits and even 7 bits and odd 8 bits and none ANSI compatible control sequences
Electrical Requirements	95 to 128 V, 47 to 63 Hz, or 190 to 256 V, 47 to 63 Hz
Operating Conditions	Relative Humidity: 10 to 90% Temperature: 10 to 40°C (50 to 104°F)

Appendix D – Demo Tips

By connecting to the local port of DECtalk, you or the customer can type words or phrases for DECtalk to speak. This is an easy way to let a prospective DECtalk customer hear DECtalk work.

The setup requires a video terminal (or personal computer or word processor to be used in terminal mode) and a DECtalk. Connect the terminal communications port to the LOCAL port on the DECtalk. (The local port is the RS232-C connection closest to the middle of the DECtalk.) Match the video terminal communication speed to the DECtalk port. Factory default on the DECtalk is 9600 baud. Sending a BREAK down the line will put DECtalk in SETUP mode. Type OFFLINE followed by a carriage return. Then type EXIT followed by a carriage return. You will see a right angle bracket as a prompt and are ready to type into the DECtalk.

Summary

BREAK
SETUP> OFFLINE C/R
SETUP> EXIT C/R
>

At this point simply type a word or phrase followed by a period and carriage return. DECtalk will speak the phrase. DECtalk control codes can also be entered this way.

To demonstrate some of DECtalk's capabilities, try the following:

Reason	Input	Shows
• Difficulty of speech synthesis, complexity of linguistics	• cat, cellar, cello	• DECtalk pronounces each "c" correctly
• Ability to understand context	• $17.35 and $17.35 million	• DECtalk considers context
• Ability to understand abbreviations	• St. Marks St., Pres., Gov.	• Context, abbreviations
• Letter-to-sound rules, DECtalk tries to speak anything	• Any jibberish including vowels, e.g., efgihir	• DECtalk applies letter-to-sound rules to speak
• Words can be pronounced by respelling	• Peter, Peater; Michael, Miikal	• Do not need to know phonetics to make it pronounce words

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